UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN FRANCISCO DIVISION

COREPHOTONICS, LTD.,

Plaintiff,

v.

APPLE INC.,

Defendant.

Case No. 3:17-cv-06457-JD (lead case)
Case No. 5:18-cv-02555-JD

DECLARATION OF JOHN TESAR IN SUPPORT OF APPLE INC.'S PROPOSED CLAIM CONSTRUCTIONS

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I, John Tesar, declare and state as follows:

1. I submit this declaration regarding the meaning of certain claim terms recited in U.S. Patent No. 9,568,712 ("'712 Patent").

I. QUALIFICATIONS AND EXPERIENCE

2. My qualifications and professional experience are described in my Curriculum Vitae, a copy of which is attached hereto. The following is a brief summary of my relevant qualifications and professional experience.

3. As shown in my curriculum vitae, I have extensive academic and industry experience with optical engineering. Specifically, I have over 35 years of industry experience in the field of optical sciences and optical engineering in general, including optical instrumentation, optical design, and optical fabrication and testing.

4. For more than 30 years, I have been performing lens design and managing teams designing lenses, including design, fabrication, and testing optical devices. Currently and since 2019, I have been an optical design consultant at my consulting company, John Tesar and Associates, LLC. I have designed numerous lenses in this work. This included consulting for Malin Space Science Systems, for whom I designed optics for 7 cameras for use in the next NASA Mars orbiter for Malin's supplier of optics, Tucson Optical Research Corp (TORC).

5. I also currently serve as Chief Technology Officer for CamPlex Inc., a company I cofounded. My work with CamPlex includes design of a surgical imaging platform including design of the lenses for endoscopes, miniature cameras on retractors and stereo microscopes for surgery. Some of these systems, endoscopes and miniature camera system for retractors contain lens assemblies somewhat similar in size and function to that of cell phone camera lenses.

6. Prior to CamPlex, I served as Director of Optics for Novadaq Technologies, Inc. where I designed and developed optics for endoscopes. At Novadaq, I also designed and fabricated an ophthalmic imaging and treatment workstation to simultaneously see and illuminate in both visible and near infrared enabling directing laser energy to the retina/choroid. Cell phones now

contain Near IR optical modalities as well, permitting them to 'see' in wavebands not seen in human vision.

7. Prior to Novadaq, I worked at Raytheon Missile Systems as a Principal Systems Engineer in optical design and a Manager of the Optical Design Section. In these roles I managed a group of twelve optical designers. I also designed optical systems for unmanned reconnaissance vehicles and space-based missile defense initiatives. For example, I designed optics for two Raytheon missile programs and the optics for the Joint Standoff Unitary Weapon for the Navy.

8. Prior to my work at Raytheon, I was involved in optical design since at least 1990. That experience included designing optics for surveillance tools deployed by a contractor to the U.S. Navy and State Department, some of these optical systems are, or were, in the office of the Chairman of the Federal Reserve. In addition, I designed optics for a miniature camera for use in surveillance or covert applications. I also worked extensively on optical design of endoscope instruments including serving as Director of Optics for Karl Storz Endovision, where I designed and developed numerous optical systems for endoscopes, including what are known as chip-in-tip endoscopes. These optics are very similar to optics in cell phones and cameras in tablets and laptops. In fact, the leading manufacturer of disposable endoscope optics now is a very large supplier of optics modules for tablets, phones and laptops, Omnivision.

9. I have extensively used lens design programs to design and optimize lens designs for 25 years. The programs I have used include Zemax, Code V, Fred, and ASAP. My experience with lens analysis programs also includes my work as Vice President of Sales for Breault Research Organization's Optical Engineering Software division from February 1997 to April 1998.

10. My formal education includes a Bachelor's degree in Economics at New Mexico State University. I have also taken optics classes at the University of Arizona at Tucson (one of the top optics programs in the country) and at the University of California at Los Angeles.

11. A list of my patents is contained in my CV. I am a named inventor on more than two dozen issued patents and several pending patent applications in the area of lens design,

including patents specifically reciting "lens assemblies." These patents include:

- U.S. Patent No. 7,054,076, "Lens assembly and optical imaging system using same," issue date May 30, 2006
- U.S. Patent No. 7,918,559, "Choroid and retinal imaging and treatment system," issue date April 5, 2011 (claiming ("A device for visualizing one or more of the choroids and retina in the eye of a subject" including "a focal assembly" and "a collimating assembly")
- U.S Patent No. 9,918,619, "Highly corrected relay system," issue date March 20, 2018 (claiming "a highly corrected relay system for an endoscope" including "pair of rod lens assemblies")
- U.S. Patent No. 9,182,577, "Variable direction of view instrument with distal image sensor," issue date November 10, 2015 (claiming "an endoscopic device" including "a reflecting assembly")
- U.S. Patent No. 7,221,522, "Optical system for variable direction of view instrument," issue date May 22, 2007.
- U.S. Patent No. 10,231,608, "Illumination system for variable direction of view instruments," issue date March 19, 2019.
- U.S. Patent No. 10,918,455, "Variable light source," issue date February 16, 2021 (claiming "An illumination device" including a "color mixing assembly")

II. INTRODUCTION

12. I have been retained by counsel for Apple Inc. ("Apple") as a technical expert in connection with the litigation identified above. Specifically, I have been asked to provide my opinions regarding the state of the art and the technology of the '712 Patent as well as how those of ordinary skill in the art of the '712 Patent at the time would have understood certain terms in the claims of the '712 Patent at the time of the patent, around 2013. My opinions are based on my education, knowledge, and experience in the field of the '712 Patent, and the intrinsic and extrinsic

evidence to the '712 Patent that I have reviewed.

13. I have been asked to opine on the correct meaning of the claim term "lens assembly" in the context of the '712 Patent.

14. Compensation for my work in this matter is based on my standard consulting hourly rate of $125 per hour. This compensation is not contingent on the outcome of this matter, nor is it contingent on the specifics of my testimony. I have no personal or financial stake, nor any interest in the outcome of the present proceeding.

III. LEVEL OF ORDINARY SKILL IN THE ART FOR THE '712 PATENT

15. I understand that the level of ordinary skill may be reflected by the prior art of record, and that a Person of Ordinary Skill in The Art ("POSITA") to which the claimed subject matter pertains would have the capability of understanding the scientific and engineering principles applicable to the pertinent art. I understand that a POSITA has ordinary creativity, and is not an automaton.

16. I understand that there are multiple factors relevant to determining the level of ordinary skill in the pertinent art, including (1) the levels of education and experience of persons working in the field at the time of the invention; (2) the sophistication of the technology; (3) the types of problems encountered in the field; and (4) the prior art solutions to those problems.

17. I am familiar with lens design art pertinent to the '712 Patent. I am also aware of the state of the art at the time the application resulting in the '712 Patent was filed. I have been informed by counsel that the earliest claimed priority date for the '712 Patent is July 4, 2013, although any given claim of the '712 Patent may or may not be entitled to the earliest claimed date.

18. I have been informed that Dr. Jose Sasian, Professor of Optics and Astronomy at the University of Arizona, Tucson, served as an expert for Apple in several *inter partes* review proceedings, including proceedings related to the '712 Patent. Dr. Sasian holds a Bachelor of Science degree in Physics, a Master of Science from the University of Arizona, and a Ph.D. in Optical Sciences from the University of Arizona. Ex. O (IPR 2018-01146, Sasian Decl.), ¶ 10. I

have been informed that in those proceedings, Dr. Sasian opined as follows regarding a person of ordinary skill in the art for the '712 Patent:

> Based on the technologies disclosed in the '712 patent, I believe that a person having ordinary skill in the art ("POSITA") would include someone who had, at the priority date of the '712 patent, (i) a Bachelor's degree in Physics, Optical Sciences, or equivalent training, as well as (ii) approximately three years of experience in designing multi-lens optical systems. Such a person would have had experience in analyzing, tolerancing, adjusting, and optimizing multi-lens systems, and would have been familiar with the specifications of lens systems. In addition, a POSITA would have known how to use lens design software such as CODE V, Oslo, or Zemax, and would have taken a lens design course.

Ex. O (IPR 2018-01146, Sasian Decl.), ¶ 19; *see also* Ex. P (IPR2018-01140, Sasian Decl.), ¶ 19; (giving same definition for a POSITA for the IPR related to U.S. patent No. 9,402,032, which is the parent application of the '712 Patent and shares the same specification).

19. I agree with Dr. Sasian's opinion regarding a person of ordinary skill in the art. Based on my knowledge of the state of the art in the field, the prior art, and lens design as of the alleged priority date of the '712 Patent, a POSITA would be someone who had, as of the claimed priority date of the '712 Patent: (i) a Bachelor's degree in Physics, Optical Sciences, or equivalent training, as well as (ii) approximately three years of experience in designing multi-lens optical systems. Such a person would have had experience in analyzing, tolerancing, adjusting, and optimizing multi-lens systems, and would have been familiar with the specifications of lens systems. In addition, a POSITA would have known how to use lens design software such as CODE V, Oslo, or Zemax, and would have taken a lens design course. I would have met the requirements of a POSITA in July 2013 when the '712 Patent was filed. I also worked with and managed people who would have qualified as POSITAs in July 2013. Thus I am qualified to opine on the issues in this declaration.

20. Corephotonics' expert, Dr. Hart, opines that "a POSITA would be a person with a bachelor's [sic] approximately 2–3 years of experience in imaging systems or equivalent in

computer engineering, optical engineering, or related field, with at least 2 years of experience ***working with optical designs***." Hart Decl. (Dkt. 148-11), ¶ 14 (emphasis added).

21. I disagree that a POSITA would be someone who was merely "***working with***" optical designs. People without any significant relevant expertise or experience may "work with" optical designs, such as assistants or technicians who implement designs graphically in computer systems, managers who do not have deep technical expertise, and those who build systems that have lenses, but are not themselves trained or performing lens design. A POSITA for the '712 Patent would have experience ***designing*** multi-lens optical systems to understand the context and disclosure of the patent. A POSITA would also have knowledge of how to analyze the lens design including using lens design software. All three of Apple's and Corephotonics' optics experts who filed expert declarations in the six instituted *inter partes* review proceedings for the same family of patents as the '712 Patent agreed with this opinion that a POSITA must have substantial (at least three years) experience in lens ***design***).

22. For example, I understand Dr. Duncan Moore served as an expert for Corephotonics for the IPRs related to the '712 and '032 Patents. Dr. Moore has a B.A in Physics, M.S., in Optics, and Ph.D. in Optics, and is the Rudolf and Hilda Kingslake Professor of Optical Engineering at the University of Rochester, where he has held that position since 1993. Ex. Q (Duncan Moore Declaration for both IPR 2018-01140 and IPR 2018-01146), at ¶ 6-7. Dr. Moore opined regarding a POSITA:

> In my opinion, a person of ordinary skill in the art (POSITA) of the '032 and '712 patents, at the time of the effective filing date, would have possessed an undergraduate degree in optical engineering, electrical engineering, or physics, with the equivalent of three years of experience in ***optical design***.

Id., at ¶ 15 (emphasis added).

23. Similarly, in the IPRs challenging the validity of U.S. Patents 9,857,568; 10,317,647; 10,330,897; and 10,327,277, both Apple and Corephotonics' experts required at least three years of lens design experience. These patents issued from a continuation-in-part applications

that added certain manufacturability disclosure to the specification. Therefore, during the IPR proceedings for these patents, I understand Dr. Sasian gave essentially the same definition of a POSITA, merely adding some language to his previous definition of a POSITA to address that a POSITA would also be knowledgeable regarding manufacturability. *See, e.g.,* Ex. R (IPR2019-00030 ('568 Patent), Sasian Decl.), ¶ 19 (adding language "and/or manufacturing" to definition of a POSITA); Ex. S (IPR2020-00878 ('897 Patent), Sasian Decl., at ¶¶ 19 (adding "for manufacturing" and "and their fabrication" to the definition of a POSITA) . Ex. T (IPR2020-00896 ('647 Patent), Sasian Decl., at ¶¶ 19 (same).

24. In response, for the '568 Patent IPR, Dr. Moore used the same definition above for a POSITA as he had used for the '032 and '712 Patent IPRs. Ex. U (IPR2019-00030, Moore Decl.), at ¶ 14.

25. For the '277, '647, and '897 Patent IPRs, Dr. Tom Milster, a Professor at the University of Arizona, served as Corephotonics' expert. Dr. Milster holds a Bachelor of Science degree in Electrical Engineering and a Ph.D. in Optical Sciences from the University of Arizona. (Ex. V (IPR2020-00897 ('277 Patent), Milster Decl.), at ¶ 7. For these three proceedings, I understand Dr. Milster applied the same definition of a POSITA as Dr. Sasian had in his declarations, including that a POSITA would have knowledge of analyzing, tolerancing, adjusting, and optimizing multi-lens systems, familiarity with the specifications of lens systems, and knowledge of lens design software such as CODE V, Oslo, or Zemax, and would have taken a lens design course. Ex. V (IPR2020-00897 ('277 Patent), Milster Decl.), at ¶ 20; Ex. W (IPR2020-00896 ('647 Patent), Milster Decl.), at ¶ 20; Ex. X (IPR2020-00878 ('897 Patent), Milster Decl.), at ¶ 19.

26. Therefore, in all the IPRs, all experts for the lens assembly patents required at least three years' lens ***design*** experience, and at least Dr. Sasian and Dr. Milster further explained that this means knowledge of analyzing, tolerancing, adjusting, and optimizing multi-lens systems, familiarity with the specifications of lens systems, and knowledge of lens design software such as

CODE V, Oslo, or Zemax, and would have taken a lens design course.

27. I also note that Corephotonics did not dispute its experts definitions of a POSITA, adopting them in their Patent Owner Response filings. Ex. Y (IPR2018-00140 ('032 Patent), Patent Owner Response), at 12 ("A person of ordinary skill in the art ("POSITA") would have possessed an undergraduate degree in optical engineering, electrical engineering, or physics, with the equivalent of ***three years of experience in optical design*** at the time of the effective filing date of the '032 patent, July 4, 2013."); Ex. Z (IPR2018-01146 ('712 Patent), Patent Owner Response), at 12 (same); Ex. AA (IPR2019-00030 ('568 Patent), Patent Owner Response), at 14-17; (noting "Apple and Corephotonics both appear [to] agree would have the equivalent of three years of lens *design* experience" (emphasis in original)); Ex. AB (IPR2020-00878 ('897 Patent), Patent Owner Response), at 14-15 ("Corephotonics' expert Dr. Milster has applied the same definition of ordinary skill in his analysis [as Apple's expert Dr. Sasian]."); Ex. AC (IPR2020-00896 ('647 Patent) (stating Corephotonics "does not disagree" with the definition of a POSITA given by Apple's expert), Patent Owner Response), at 11; Ex. AD (IPR2020-00897 ('277 Patent), Patent Owner Response), at 12 ("Patent Owner does not disagree with Petitioner's definition of a POSITA.").

28. In my opinion, based on the information disclosed with his declaration, Dr. Hart would not have qualified as a POSITA nor an expert in lens design, optics, or the subject matter of the '712 Patent. I have reviewed Dr. Hart's CV and do not see any lens design experience, experience in analyzing, tolerancing, adjusting, and optimizing multi-lens systems, familiarity with the specifications of lens systems, or knowledge of lens design software such as CODE V, Oslo, or Zemax. If Dr. Hart has taken a lens design course or has equivalent experience, it is not listed in his CV. While Dr. Hart may be a POSITA under the broader definition he provides (merely requiring "experience working with optical designs"), that is not a proper definition of a POSITA for the '712 Patent and has not been accepted by any of the optics experts in proceedings between Apple and Corephotonics on this or related patents.

29. Moreover, Dr. Hart himself does not appear to view himself as an expert in optics

or lens design. For example, in one of the IPRs filed by Apple regarding Corephotonics patents, the patent had claims related to dual aperture cameras, but included some claim elements related to the optical lens design. There, Apple relied on Dr. Fredo Durand, who in turn relied upon Dr. Sasian for the optics aspects of the claims. In response, Dr. Hart relied upon a declaration by Dr. Moore to respond to Dr. Sasian's opinions regarding the obviousness of the lens and optics aspects of the claims. Ex. L, (IPR2020-00905 ('479 patent), Hart Decl.), ¶ 35 ("The lens aspects of the '479 patent are described further in Dr. Moore's declaration."), ¶ 50 ("Dr. Moore has provided a detailed discussion of the [lens prior art] references in his declaration, which I refer to where appropriate."), ¶ 89 ("Dr. Moore has provided an extensive discussion of the Kawamura and Ogata lens designs and a response to Dr. Sasian's opinions concerning scaling these lens designs, which I have reviewed. Dr. Moore is an expert in optics and in lens design, and I rely on his analysis in this declaration."), ¶¶ 90-95 (Dr. Hart relying on Dr. Moore's opinions regarding the obviousness of combining lens design and optics references).

IV. MATERIALS CONSIDERED

30. In preparing this declaration and forming my opinions stated herein, I have reviewed and considered all of the materials cited below. I have also brought to bear my many years of experience in the relevant field as discussed previously.

V. RELEVANT LEGAL STANDARDS

31. I am not an attorney. In preparing and expressing my opinions and considering the subject matter of the '712 Patent, I am relying on certain legal principles explained to me by counsel.

32. It is my understanding that in order to properly evaluate the '712 Patent, the terms of the claims must first be interpreted. It is my understanding that the claim terms are given their ordinary and accustomed meaning as would be understood by one of ordinary skill in the art, unless the inventor has set forth a special meaning for a term. In order to construe the following claim terms, I have reviewed the entirety of the '712 Patent, as well as its prosecution history.

33. I understand that patent claims are construed from the viewpoint of one of ordinary skill in the art of the patent at the time of the alleged invention. I also understand that the most important evidence to consider in construing the claims is the "intrinsic" record, which I understand includes the claim language, the patent specification, and the prosecution history.

34. I further understand that the person of ordinary skill in the art must read the claim terms in the context of the claim itself, as well as in the context of the entire patent specification. I understand that in the specification and prosecution history, the patentee may act as a lexicographer and specifically define a claim term in a way that differs from the plain and ordinary meaning. I understand that the prosecution history of the patent is a record of the proceedings before the U.S. Patent and Trademark Office, and may contain explicit representations, statements or definitions made during prosecution that affect the scope of the patent claims. I understand that an applicant may, during the course of prosecuting the patent application, limit the scope of the claims to overcome prior art or to overcome an examiner's rejection.

35. I further understand that claim terms are presumed to have the same meaning in all claims, unless there is any evidence to the contrary.

36. I further understand that under the doctrine of claim differentiation, it is presumed that no two claims in the same patent cover the same scope. Each claim is presumed to be different in scope and meaning from other claims.

37. In interpreting the meaning of the claim language, I understand that the person of ordinary skill in the art may also consider "extrinsic" evidence, including expert testimony, inventor testimony, dictionaries, technical treatises, other patents, and scholarly publications. I understand this evidence is considered to ensure that a claim is construed in a way that is consistent with the understanding of those of ordinary skill in the art at the time of the claimed invention. This can be useful for technical terms whose meaning may differ from their ordinary English meaning. I understand that extrinsic evidence may not be relied on if it contradicts or varies the meaning of claim language provided by the intrinsic evidence, particularly if the applicant has explicitly

defined a term in the intrinsic record.

38. I further understand that statements in the specification that expressly or implicitly state that specific subject matter is outside the scope of the invention can operate as a disclaimer of claim scope. I have also been informed that when the specification makes clear that the invention does not include a particular feature, that feature is deemed to be outside the reach of the claims of the patent, even though the language of the claims, read without reference to the specification, might be considered broad enough to encompass the feature in question. I further understand that, although any description of "the present invention" in the specification does not automatically limit the claims, when a patent describes the features of the "present invention" as a whole, this description can limit the scope of the invention. In addition, where the general summary or description of the invention describes a feature of the invention, and criticizes other products or systems that lack the same feature, I understand that this may also operate as a disavowal of scope.

VI. TECHNOLOGY BACKGROUND

39. In this section, I provide a brief technology background regarding the state of the art in multi-lens systems at the time of filing of the '712 Patent. The '712 patent claims address lens assemblies with a small TTL (i.e., length of the lens) and TTL < EFL i.e., telephoto lenses. I have reviewed Dr. Durand's declaration regarding the meaning of TTL and EFL and agree with those explanations, and thus will not repeat those here.

40. As relevant to this declaration, lenses including multiple lens elements have been long known in the prior art, including telephoto lenses with multiple lens elements.

VII. OVERVIEW OF THE '712 PATENT

41. The '712 Patent is titled "Miniature Telephoto Lens Assembly" and was issued on February 14, 2017.

42. The Abstract of the '712 Patent states as follows:

> An optical lens assembly includes five lens elements and provides a TTL/EFL<1.0. In an embodiment, the focal length of the first lens element f1<TTL/2, an air gap between first and second lens elements is smaller than half the second lens element thickness, an

> air gap between the third and fourth lens elements is greater than TTL/5 and an air gap between the fourth and fifth lens elements is smaller than about 1.5 times the fifth lens element thickness. All lens elements may be aspheric.

'712 Patent, Abstract.

43. The Field section of the '712 Patent states as follows:

> Embodiments disclosed herein relate to an optical lens system and lens assembly, and more particularly, to a miniature telephoto lens assembly included in such a system and used in a portable electronic product such as a cellphone.

'712 Patent, 1:18-22.

44. The Background section of the '712 Patent is reproduced below:

> Digital camera modules are currently being incorporated into a variety of host devices. Such host devices include cellular telephones, personal data assistants (PDAs), computers, and so forth. Consumer demand for digital camera modules in host devices continues to grow. Cameras in cellphone devices in particular require a compact imaging lens system for good quality imaging and with a small total track length (TTL). Conventional lens assemblies comprising four lens elements are no longer sufficient for good quality imaging in such devices. The latest lens assembly designs, e.g. as in U.S. Pat. No. 8,395,851, use five lens elements. However, the design in U.S. Pat. No. 8,395,851 suffers from at least the fact that the TTL/EFL (effective focal length) ratio is too large.
>
> Therefore, a need exists in the art for a five lens element optical lens assembly that can provide a small TTL/EFL ratio and better image quality than existing lens assemblies

'712 Patent, 1:25-41.

45. The '712 Patent in the Summary section then provides the following description of the embodiments that it discloses to address this alleged need in the prior art:

> Embodiments disclosed herein refer to an optical lens assembly comprising, in order from an object side to an image side: a first lens element with positive refractive power having a convex object-side surface, a second lens element with negative refractive power having a thickness d2 on an optical axis and separated from the first lens element by a first air gap, a third lens element with negative refractive power and separated from the second lens element by a second air gap, a fourth lens element having a positive refractive power and separated from the third lens element by a third air gap, and a fifth lens element

> having a negative refractive power, separated from the fourth lens element by a fourth air gap, the fifth lens element having a thickness d5 on the optical axis.

Id., 1:44-56.

46. The Summary further explains the importance of each of the five lens elements in the five element lens assembly, explaining as follows:

> The combined design of the first, second and third lens elements plus the relative short distances between them enable a long EFL and a short TTL. The same combination, together with the high dispersion (low Vd) for the second lens element and low dispersion (high Vd) for the first and third lens elements, also helps to reduce chromatic aberration. In particular, the ratio TTL/EFL<1.0 and minimal chromatic aberration are obtained by fulfilling the relationship $1.2\times|f3|>|f2|>1.5\times f1$
> where "f" indicates the lens element effective focal length and the numerals 1, 2, 3, 4, 5 indicate the lens element number.
>
> The relatively large distance between the third and the fourth lens elements plus the combined design of the fourth and fifth lens elements assist in bringing all fields' focal points to the image plane. Also because the fourth and fifth lens elements have different dispersions and have respectively positive and negative power, they help in minimizing chromatic aberration.

Id., 2:12-29.

47. The patent goes on to describe several embodiments of the invention. All of the embodiments have five lens elements. Figures 1A, 2A, and 3A of the '712 Patent illustrate three embodiments. *See* '712 Patent, Figs. 1A, 2A, 3A. Each embodiment is described in the accompanying text. *Id.*, 2:58-3:12 (describing embodiment of Figure 1A), 4:60-5:13 (describing embodiment of Figure 2A), 6:9-30 (describing embodiment of Figure 3A).

48. The specification does not describe that any embodiment of the lens assembly of the described invention has more or less than five lens elements.

49. The claims of the '712 Patent each recite a "lens assembly" that is "comprising" certain elements. Claim 1 is reproduced below for reference.

> 1. A lens assembly, comprising: a plurality of refractive lens elements arranged along an optical axis, wherein at least one surface of at least one of the plurality of lens elements is aspheric, wherein the lens assembly has an effective focal length (EFL), a total track length (TTL) of 6.5 millimeters or less and a ratio TTL/EFL of less than 1.0, and wherein the plurality of lens elements comprises, in order from an object side to an image side, a first lens element with a focal length f1 and positive refractive power, a second lens element with a focal length f2 and negative refractive power and a third lens element with a focal length f3, the focal length f1, the focal length f2 and the focal length f3 fulfilling the condition 1.2×|f3|>|f2|>1.5×f1.

50. None of the claims of the '712 Patent state that the "lens assembly" has more than five lens elements.

VIII. STATEMENT OF OPINIONS

51. In my opinion, a person of ordinary skill in the art reviewing the '712 Patent would have understood that the "lens assembly" described and claimed in the patent is limited to five lens elements. This opinion is based upon my review of the patent specification and claims as well as my experience in the relevant field.

52. The '712 Patent makes clear that it is directed to addressing a specific need in the art for a "five lens element optical lens assembly." '712 Patent, 1:39-40. In its Background section, the patent acknowledges that lens assemblies with four lens elements existed in the prior art, but states that "[c]onventional lens assemblies comprising four lens elements are no longer sufficient for good quality imaging in digital camera modules requiring compact imaging lens systems, such as cell phones. '712 Patent, 1:29-34. The patent also acknowledges that five lens element lens assemblies existed in the prior art, such as in U.S. Patent No. 8,395,851, but states that this lens design "suffers from at least the fact that the TTL/EFL (effective focal length) ratio is too large." *Id.*, 1:34-38. The patent states that it addresses a specific need in the prior art: "a need exists in the art for a five lens element optical lens assembly that can provide a small TTL/EFL ratio and better image quality than existing lens assemblies." *Id.*, 1:39-40.

53. Based on these statements, a POSITA would have understood that the invention of

the patent is specifically directed to a five lens element optical lens assembly. The patent criticizes lens assemblies with four lens elements as insufficient for providing good quality in compact systems, and teaches that it addresses a need for a "five lens element" lens assembly. This is the only need or problem that the patent states that it is addressing. The only way that the invention could address the stated need for a "five lens element" lens assembly is by providing a five lens element lens assembly.

54. The Abstract of the '712 Patent confirms the same meaning. The Abstract starts with the following statement: "An optical lens assembly includes five lens elements and provides a TTL/EFL<1.0." '712 Patent, Abstract. A POSITA would have understood that this indicates that the invention of the patent is an optical lens assembly that includes five lens elements. This meaning is further confirmed by the fact that this categorical statement contrasts with the remainder of the Abstract, which continues on to state that "[i]n an embodiment," the five lens elements may have certain features and characteristics. *Id*. The Abstract therefore indicates that the invention is an optical lens assembly that includes five elements, and one embodiment of that lens assembly may have certain optional features.

55. The Summary of the '712 Patent confirms the same meaning. The Summary first describes that the embodiments of the invention provide a lens assembly that has five lens elements. '712 Patent, 1:44-56. The Summary then goes on to summarize that "some" embodiments of its invention "may" also have other features. *Id.*, 1:58 ("may further include a stop positioned before the first lens element"), 2:9 ("the surfaces of the lens elements may be aspheric"). Finally, the Summary explains the importance of each of the five lens elements in the five element lens assembly. *Id.*, 2:12-29. For example, with respect to the first three lens elements, "[t]he combined design of the first, second and third lens elements plus the relative short distances between them enable a long EFL and a short TTL." *Id*., 2:12-15. And "[t]he same combination, together with the high dispersion (low Vd) for the second lens element and low dispersion (high Vd) for the first and third lens elements, also helps to reduce chromatic aberration." *Id*., 2:15-18. With respect to

the fourth and fifth lens elements, "[t]he relatively large distance between the third and the fourth lens elements plus the combined design of the fourth and fifth lens elements assist in bringing all fields' focal points to the image plane. Also, because the fourth and fifth lens elements have different dispersions and have respectively positive and negative power, they help in minimizing chromatic aberration." *Id*., 2:23-29. In view of these teachings, the Summary would have further confirmed the understanding of a POSITA that the lens assembly of the invention is limited to five lens elements.

56. The Detailed Description section of the specification, describing multiple embodiments of a five lens element lens assembly, would have been understood by a POSITA to be consistent with the same meaning. Each of the embodiments of a lens assembly of the invention, such as shown in Figures 1A, 2A, and 3A and described in the corresponding text, has five lens elements that each have certain characteristics and spacing between them as described in the text. The specification never describes that any embodiment of the invention has more or less than five lens elements.

57. The detailed teachings of the specification also make clear that the "lens assembly" of the invention of the '712 Patent is a self-contained operational unit of five optical lens elements. This point is significant because Corephotonics's alternative proposed construction, an "arrangement of optical lens elements," would encompass any jumbled collection of disparate lens elements that is not operational to render a focused image. A POSITA would have understood that by distinguishing the prior art and purportedly providing a solution with a five lens element lens assembly, the "lens assembly" of the invention is a self-contained operational unit. It would be understood to be "self-contained" in the sense that the five lens elements are sufficient to provide an image properly focused at the image plane, as shown in Figures 1A, 2A, and 3A, without needing any additional lens element or corrective measures to properly obtain an image. It would be understood to be "operational" in the sense that it can operate reasonably properly to obtain an image, as opposed to providing only scattered incoming light that is not focused at the image plane.

58. As a matter of terminology, a POSITA would alternatively understand the "lens assembly" of the invention could be deemed a "lens" limited to five elements. The structure that the '712 Patent refers to as a "lens assembly" of its invention, containing five optical lens elements, is also sometimes referred to simply as a "lens."

59. The language of the claims of the '712 Patent is consistent with the same meaning. None of the claims states that any "lens assembly" of the invention has more than five lens elements, and all of the claims are consistent with the "lens assembly" having five lens elements. A POSITA would have understood that the claims do not alter the meaning provided by the specification that the invention provides, and solves a need for, a five lens element lens assembly. Claims 1 and 15 recite a lens assembly "comprising" certain components as stated in each claim, and the other claims of the patent directly or indirectly depend from and incorporate claim 1 or claim 15. '712 Patent, claims 1, 15, 2-14, 16-19. I am informed and understand that in patent claim drafting parlance, "comprising" is an open-ended term that leaves open the possibility of additional elements.[1] Claim 1 recites a "lens assembly, comprising: a plurality of refractive lens elements arranged along an optical axis," where the lens assembly is "comprising" a "first lens element," a "second lens element," and a "third lens element." '712 Patent, claim 1. Setting aside the specification, the claim language, considered in isolation by itself, would be agnostic as to the total number of lens elements contained in the lens assembly, except to require that it must be at least three lens elements. In view of the specification, however, a POSITA would have understood that the "lens assembly" is limited to five lens elements, and is a self-contained operational unit as described in the specification. Dependent claims 2 and 4 (and therefore also the additional claims that depend from those claims) further specify a "fourth lens element" and/or "fifth lens element" along with certain additional requirements, including an air gap greater than TTL/5 for claim 2 and positive or negative refractive powers for claim 4. '712 Patent, claims 2 and 4. In context of the

[1] *See*, *e.g.*, Manual of Patent Examining Procedure § 2111.03 ("The transitional term 'comprising', which is synonymous with 'including,' 'containing,' or 'characterized by,' is inclusive or open-ended and does not exclude additional, unrecited elements or method steps.") (available at https://www.uspto.gov/web/offices/pac/mpep/s2111.html).

entire specification and claims, a POSITA would have understood that each claim is directed to a "lens assembly" that is a self-contained operational unit limited to five lens elements, with each claim focusing on certain features and characteristics of the lens elements and their respective spacings as stated in each claim.

60. Claim 15, the other independent claim, similarly recites a "lens assembly, comprising: a plurality of refractive lens elements arranged along an optical axis" and explicitly recites five lens elements. '712 Patent, claim 15. For the same reasons as discussed above for claim 1, a POSITA would have understood that the claim language, considered in isolation by itself and setting aside the specification, would be agnostic as to the total number of lens elements, but the specification informs a POSITA that the "lens assembly" is limited to five lens elements, and is a self-contained operational unit as described in the specification.

61. It is also my opinion that if the "lens assembly" of the '712 Patent invention were not limited to five lens elements, and instead were interpreted to encompass lens assemblies that have four or fewer lens elements, or six or more lens elements, then a POSITA would have understood that the specification of the '712 Patent would not properly support the claims because the specification does not describe any embodiment of the "lens assembly" of the invention that has more or less than five lens elements. Each embodiment in the specification is a lens assembly with five lens elements, with the features of each lens element and the spacing between each element stated to provide an operational unit that correctly focuses incoming light at the image plane. In this regard, a POSITA would have considered that each lens assembly embodiment described in the specification is a self-contained operational unit with five lens elements. To remove one or more of those lens elements would materially change the design and operation of the lens assembly and render it inoperable to correctly focus incoming light. Similarly, to add one or more refractive lens elements in addition to the five lens elements, is not disclosed by the specification and would require a significant redesign and recalculation of the optical properties of the set of lens elements in order to build an operational lens assembly that correctly focuses

incoming light at the image plane. Each lens element within the five lens element assemblies in the specification is designed and placed specifically to work within the operational whole. For example, based on the descriptions in the specification, the fourth and fifth lens elements (the two elements on the right side of the lens assemblies shown in Figures 1A, 2A, and 3A) would have been understood to serve a purpose of minimizing chromatic aberration, as described in the specification. '712 Patent, 2:27-29 ("Also, because the fourth and fifth lens elements have different dispersions and have respectively positive and negative power, they help in minimizing chromatic aberration."). To simply remove one or both of those lens elements would be expected to result in significant degradation and need for redesign, as one could imagine by looking at the left-hand figure in Figure 3A depicting the dispersion of light through all five lenses to the focal plan on the right, and visualizing that one or both of those two right-side lens elements were removed. A POSITA would need to determine how to achieve acceptable performance with the remaining lens elements. The '291 patent itself states that "four lens elements are no longer sufficient for good quality imaging in" cameras requiring "a compact imaging lens system for good quality imaging and with a small total track length (TTL). This confirms that designing a three or four lens design that would have acceptable performance while meeting the other requirements in the claims such as a track length less than 6.5 mm and a TTL/EFL less than 1.0 would require significant development and is not described by the '712 patent. Significant redesign issues would also arise with respect to maintaining desired focal length and F# as well as controlling for field curvature and distortion, other variables of concern discussed by the '712 Patent (including as addressed by Tables 1-6 in the patent specification and the accompanying descriptions), that would also have been well-known to a POSITA in the field of lens design. By the same token, to add a sixth or seventh lens element into one of the disclosed five-element lens assemblies would introduce unspecified changes that would require redesign, depending on the location and configuration of the lens element. The performance of the lens would change as the light must pass through the additional lens element while providing the desired overall focal length, track length, F#, etc. In

addition, each lens element includes numerous design considerations (aka "degrees of freedom") that greatly increase the variables that must be considered and specified. These types of modifications may have been obvious to a POSITA, depending on the context, but a POSITA would not understand them to be disclosed in the '712 Patent.

62. I have reviewed the declaration of Dr. Hart submitted with Corephotonics' opening claim construction brief, and the opinions stated in that declaration do not change my opinions.

63. In paragraphs 68-70, Dr. Hart's declaration opines that the term "lens assembly," considered in isolation by itself, is not necessarily limited to five lens elements. However, it is my understanding based on the legal instructions provided to me that claim language must be interpreted in view of the specification. The specification of the '712 Patent makes clear to a POSITA that the "lens assembly" of the invention of the '712 Patent is limited to five lens elements, for the reasons discussed previously.

64. In paragraph 70, Dr. Hart's declaration states that references were cited during prosecution of the '712 Patent that have varying numbers of lens elements. However, the specification of the '712 Patent that was filed with the Patent Office clearly teaches that the "lens assembly" of the invention is limited to five lens elements. Dr. Hart does not point to any explicit contrary statement by the applicant to the Patent Office during prosecution that the "lens assembly" of the invention is *not* limited to five lens elements. The references identified in the Information Disclosure Statement filings might have been identified for any of a number of different reasons that do not bear on the meaning of "lens assembly," for example due to potentially relevant features disclosed in those references unrelated to the number of lens elements (for example, refractive powers or lens spacing features), or perhaps merely because those references turned up in a prior art search that was then provided in its entirety to the Patent Office. A POSITA would not have understood the citation of those references to change the meaning of "lens assembly" provided by the '712 Patent.

65. In paragraph 71, Dr. Hart's declaration notes that claim 1 of the '712 Patent does

not explicitly state that the claimed "lens assembly" is limited to five lens elements, but the specification provides that meaning, as discussed previously. For the same reasons, I disagree with the opinion where Dr. Hart opines that since claim 1 explicitly refers to three lens elements, therefore "claim 1's "lens assembly" must comprise at least three lens elements and, by implication, may be practiced with a lens assembly with three lens elements."

66. In paragraph 72, Dr. Hart's declaration notes that dependent claims 2 and 4 explicitly recite a "fourth" and/or "fifth" lens element and opines that "[t]he drafter plainly did not intend the phrase 'lens assembly' to take on a specific 'five element' requirement." Again, however, it is my understanding that the claim language needs to be interpreted in view of the specification, and the specification clearly informs a POSITA that the drafter of the patent did indeed intend to limit the "lens assembly" to a five element lens assembly, as discussed previously, because that is what the specification repeatedly makes clear.

67. In paragraph 73, Dr. Hart's declaration discusses the specification's Background section. The declaration opines that "the ***number*** of lenses in the claimed assembly is not a crucial aspect of the invention" (emphasis in original). I respectfully disagree with this assertion. The specification makes clear that the number of lens elements is quite important. The number of lens elements in a lens is often a critically important factor in the design and operation. As a general principle (not a rule), increasing the number of lens elements can allow for greater precision and flexibility in designing a high-quality lens assembly, but more lens elements necessarily take up more physical space, which is an important factor in applications where size is constrained, such as cameras in cell phones. A POSITA would have understood that these considerations would be particularly applicable in the context of the '712 Patent where the purpose of the invention is to provide a compact or "miniature" telephoto lens of certain small dimension (for example, a "cellphone" application, see '712 Patent at 1:17-32, and a compact size such as fitting within a total track length of 6.5 mm or less as recited in claim 1 of the '712 Patent). The specification's background specifically criticizes that "[c]onventional lens assemblies comprising four lens

elements are no longer sufficient for good quality imaging in such devices." '712 Patent, 1:31-41. Thus the specification informs us that the number of lenses is absolutely a crucial factor, because conventional assemblies with only four lens elements are no longer sufficient for the desired quality in the desired application. This fits with the general principle that (all other things being equal) more lens elements generally provides for higher quality. The specification continues by making clear that "a need exists in the art for a ***five lens element*** optical lens assembly" that provides sufficient quality, which again reinforces the fact that the number of lenses is a crucial factor. '712 Patent, 1:38-41 (emphasis added). The specification did not merely state "a need exists in the art for an optical lens assembly" that provides sufficient quality—instead, it criticizes four-element lens assemblies as inadequate and specifically touts the need for "a five lens element" solution.

68. Paragraph 73 of the Dr. Hart declaration also states that "if the term 'lens assembly' by itself meant an assembly of five lens elements, then the specification's reference to a lens assembly with four elements would be nonsensical." I respectfully disagree with this assertion, which misses the point of the claim interpretation inquiry. The point under consideration is the proper meaning of the term "lens assembly" as recited in the claims of the '712 Patent, not the meaning of the term "lens assembly" in isolation separate and apart from the invention of the '712 Patent. There are instances, separate and apart from the invention of the '712 Patent, where the term "lens assembly" is used with a meaning that does not limit the lens assembly to five lens elements, including in my own work and patent application filings for example, as well as in the '712 Patent where the specification describes the background prior art. But where the '712 Patent states that there were "lens assemblies comprising four lens elements" in the prior art, the patent then pointedly criticizes that prior art and makes clear that the lens assembly of the invention of the '712 Patent is limited to five lens elements, as discussed previously. The question at hand is the meaning of the term "lens assembly" as recited in the claims of the '712 Patent that define the invention, which is the question that I have endeavored to opine upon.

69. Paragraph 74 of the Dr. Hart declaration notes that the embodiments in the

specification describe lens assemblies each with five lens elements, such as shown in Figures 2A and 3A. To be clear, I do not base my opinion on the meaning of "lens assembly" in the '712 Patent claims solely based on the disclosed embodiments, and instead consider the entirety of the record, all of which is consistent with the meaning, as discussed previously. I note that Dr. Hart does not identify any disclosure in the specification stating that the "lens assembly" of the invention may have more or less than five lens elements.

70. Finally, paragraph 75 of the Dr. Hart declaration states that Dr. Hart does not see support in the evidence for "lens assembly" being a self-contained operational unit. I note that Dr. Hart does not appear to be an expert in the field of optical design and does not appear to have significant experience working with lens designs, so perhaps that deficiency affected Dr. Hart's opinion. In my opinion, the disclosure of the '712 Patent makes clear that the "lens assembly" of the invention is a self-contained operational unit with five lens elements for the reasons discussed previously. This understanding would have been clear to a POSITA. The POSITA would understand that the "lens assembly" of this invention is not merely a jumbled collection of disparate lens elements that is not operational to render a focused image, as would be contemplated by Corephotonics' proposed construction. Instead, the "lens assembly" would be understood to be an operational unit including five lens elements that is self-contained in the sense that it does not require additional lens elements or other corrective measures in order to properly obtain an image, as discussed previously.

I declare under penalty of perjury that the foregoing is true and correct to be best of my knowledge. Executed on October 13, 2022 at Tucson, Arizona.

John Tesar

John Tesar and Associates, LLC
March 2019 - present
Designed optics for 7 cameras which will go in the next Mars orbiter providing a 'Weather Channel' like view over the surface where the Mars Rovers are operating. 6 of the cameras operate in the infrared and 1 in the visible. Cloud gas and chemical composition studies will be conducted by NASA, in addition to a visible view. Launch in 2024-2025. Client: Malin Space Science Systems in San Diego. - This co. has produced multiple camera systems for NASA. Designing Drone optics for the Dragonfly mission to Saturn's moon, Titan. (A competition, also by Malin) Designed optics and prototypes for the largest US Dental Camera company. Designed Axicon illumination system for Alcon, the largest Ophthalmic company. Designed micro-optics and illumination system for Apre Instruments, an interferometry company. Designed opto-mechanical system and fabricated micro- components for a Pill camera. Designing high efficiency LED light sources, on spec. (On going) Provided analysis for the National Observatory in Egypt for their telescope regarding baffling for spectrograph change. Redesigned SDSU's telescope baffles. Produced 50 micron core fiber assemblies for astronomical use connecting spectrographs and telescopes. Mountain top applications (University telescopes in Chile, China, and more under bid) (fiber length 50 ft) guaranteed flatness of fiber faces 1/10 wave. Used in exoplanet and star spectrographic composition studies. On going micro-optical metrology for a German micro-optics company.

CamPlex Inc., **CoFounder and CTO**
May 2012 - present
Cofounded a surgical imaging platform for Neurosurgery, Spine, ENT, Oral and other specialities. Designed and developed RetractorCams, CamTools, and a decoupled stereo microscope, enabling over-the-patient viewing and source switching in a binocular stereo display, or on wall monitors. 2M+US on IP, and 8M on development. Named inventor on 21 of the 23 issued patents. More patents pending.

Novadaq Technologies, Inc., Director of Optics
April 2005 - May 2012
Designed and developed endoscopes for simultaneous visible and NIR imaging with exogenous dyes and native tissue fluorescence. Designed and fabricated an ophthalmic imaging and treatment workstation to simultaneously see and illuminate in both visible and near infrared enabling directing laser energy to the retina/choroid for the treatment of wet AMD. 3 issued patent and 1 continuing application. Novadaq was sold to Stryker for $700M in 2017.

Raytheon Missile Systems, Principal Systems Engineer (optical design), Manager Optical Design Section, Raytheon Six Sigma Expert
April 1999 - April 2005
Manager Optical Design Group (12 optical) designers. Designed optical systems for unmanned reconnaissance vehicles and space based missile defense initiatives. Responsible Engineering Authority, REA, (optics) for two 100M$+ missile programs at Raytheon. Established new metrology at Raytheon using Zeiss CMMs. Designed optics for Joint Standoff Unitary Weapon, JSOW, for the Navy. Picked from a workforce of 10,000 engineers and technical workers in Tucson to be a part of a class of 100 Six Sigma Experts, Raytheon's equivalent of Black Belt. Certified in Nov.'01. Led team improvement projects in factory and finance. Secret security clearance (not current).

John Tesar and Associates, LLC
April 1998 - April 1999
Designed optics for surveillance, deployed by the US Navy and State Dept., issued 2 patents for a military client. Co-founded with 3 Caltech students an endoscopy company which we sold to Karl Storz. The company's 3 other founders won the entrepreneurial award of the year at Caltech in Pasadena for the company concept. Issued 3 patents. Independent optical design consulting for European and US firms, Linvatec and Henke Sass Wolf. Independent optical/illumination design consulting to semiconductor ball grid array microscope inspection supplier.

Breault Research Organization, VP Sales, Optical Engineering Software
February 1997 - April 1998
Produced the largest yearly, largest quarterly and largest monthly sales totals of software seats and revenue in company at that time. Developed performance metrics for the staff and implemented a database management system for customer tracking. Breault's optical analysis software is a non-sequential ray-tracing program, which is used for illumination design and analysis by aerospace, display, medical and auto companies, e.g. Ford, Boeing, Raytheon, TI (DLP), Philips, Osram, etc.

Karl Storz Endovision, Director, Optics
September 1990 - February 1997
Responsible for optical design, testing, introduction to manufacturing, fabrication and sourcing for Karl Storz's U.S. endoscope facility. Responsible for optical testing of new and existing product lines for FDA submissions, new product development, and competitive analysis. Approved funding and support to establish a US based micro-optics supplier, Bern Optics. Designed and developed optics, process methods, and testing for 3 major optical products, a 7.5 French Ureteroscope, 10 French Hysteroscope, and 15 French Cystoscope, produced in Charlton, MA. Designed numerous optical systems for endoscopes produced in Germany, including the first KS chip-in-tip flexible, and advanced materials Laparoscope. Served on Karl Storz's corporate advanced technology board, one of 6 members.

John Tesar and Associates LLC
August 1986 - August 1990
Designed and produced prototype optical instruments for Karl Storz Endoscopy Inc.

Urban Engineering, Product Manager
January 1983 - July 1986

Managed the customer relations and sales for a 20 person engineering and prototyping. The product mix of optical and mechanical instruments (primarily microscopic and endoscopic). OEM to Karl Storz Endoscopy Inc., Carl Zeiss, and Wild.

Education

- Raytheon 6 Sigma Expert (Black Belt)
- MBA classes at Worcester Polytechnic Institute (Massachusetts)
- Bachelors, Economics, Math track at New Mexico State University
- Optics classes, University of Arizona and UCLA
- Programming: Fortran, sequential and non-sequential optics software programs - Zemax, Code V, Fred, and ASAP

Accomplishments

- Chairman, Advisory Board at University of Arizona College of Medicine (Arizona Simulation Technology and Education Center (ASTEC)) (volunteer position - no longer active)
- Publications: SPIE and Laser Focus World
- Top 10 finisher in 1998 International Lens Design Competition sponsored by the Optical Society

Patents

Lens assembly and optical imaging using same	US20050200977A1
Lens assembly	WO2010096198A1
Illumination system for variable direction of view instruments	US7909756B2
Optical system for variable direction of view instrument	US7221522B2
Variable direction of view instrument with distal image sensor	US9182577B2
Variable directivity of viewing apparatus equipped with image sensor at tip	US8773756B2
Choroid and retinal imaging and treatment system	US7918559B2
Near infrared imaging	US9877654B2
Highly corrected relay system	US9918619B2
Imaging speculum for otology	Patent pending

Surgical Retractor with Video Cameras	US9492065
Surgical Visualization Systems	US10231607
Surgical Visualization System with Camera Tracking	US9615728
Optics for Video Cameras on a Surgical Visualization System	US9216068
Optics for Video Camera on a Surgical Visualization System	US9723976
Hydraulic System for Surgical Applications	US10022041
Interface for Viewing Video From Cameras on a Surgical Visualization System	US9681796
Surgical Visualization System.	US10555728
Optical Assembly Providing a Surgical Microscope View for a Surgical Visualization System	US9936863
Surgical Visualization Systems	US9782159
Surgical Visualization Systems and Displays	US10028651
Surgical Visualization Systems and Displays	US10568499
Surgical Visualization Systems	US10231607B2
Surgical Visualization Systems and Displays	US20210169606A1
Surgical Visualization Systems and Displays	US11154378B2
Surgical Visualization Systems and Displays	US10028651B2
Surgical Visualization Systems and Displays	US20170143442A1
Variable light source	US20220000577A1
Surgical Visualization Systems and Displays	US20180368656A1
Surgical Visualization Systems and Displays	EP2999414B1
Variable light source	US20200318810A1

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